



QS-R-008
REVISION D

EFFECTIVE DATE: October 21, 2003

George C. Marshall Space Flight Center
Marshall Space Flight Center, Alabama 35812

ORGANIZATIONAL INSTRUCTION

RELIABILITY ALLOCATION

OPR(s)

QS40

OPR DESIGNEE

Prince Kalia

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DOCUMENT HISTORY LOG

Status (Baseline/ Revision/ Canceled)	Document Revision	Effective Date	Description
Baseline		11/20/97	
Revision	A	7/1/99	Changes made to reflect new organization code changes and/or Changes made to reflect new directives renumbering scheme and to incorporate the corrective action for closure of NCR 266
	B	7/7/01	Changed OPR and OPR Designee. Added Quality Records table.
Revision	C	9/09/02	Format and numbering change to implement requirements of QS-A-001 rev F.
Revision	D	10/21/03	Added applicable and reference documents, revised Instructions

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Reliability Allocation

1. PURPOSE, SCOPE, APPLICABILITY

1.1 Purpose

The purpose of this Organizational Instruction (OI) is to provide procedures that can be used to allocate system reliability requirements or goals down to the subsystem and component level.

1.2 Scope

Reliability allocation is the process of subdividing a system reliability requirement or goal into subsystem and component requirements or goals.

1.3 Applicability

This OI is applicable to all S&MA personnel supporting MSFC programs and projects that require or specify reliability requirements.

2. DOCUMENTS (Applicable and Reference)

2.1 Applicable Documents

NPD 8720.1	NASA Reliability and Maintainability (R&M) Program Policy
NASA-STD-8729.1	Planning, Developing and Managing an Effective Reliability and Maintainability (R&M) Program

2.2 Reference Documents

Reliability in Engineering Design, K.C. Kapur and L.R. Lamberson, 1977, p. 405-414.

Handbook of Reliability Engineering and Management, W.G. Ireson and C.F. Coombs Jr., 1988, p. 18.34-18.42.

Reliability Toolkit: A Practical Guide for Commercial Products and Military Systems Under Acquisition Reform, Reliability Analysis Center

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3. DEFINITIONS

All definitions applicable to this OI are addressed in NASA-STD-8729.1

4. INSTRUCTIONS

A system reliability requirement or goal must be specified prior to performing a reliability allocation to the lower subsystem and component level. To perform the reliability allocation, relevant information is needed pertaining to data on other similar systems and information regarding the current system design. This should include information regarding the complexity and function of the system/subsystem. The instruction steps are outlined below and are referenced in the Flow Diagram in Section 11. The reliability allocation should be updated as appropriate (i.e., with design changes or design evolution).

<u>Steps</u>	<u>Action</u>
4.1	Identify the system and elements, which are being evaluated. Define system reliability requirement or goal.
4.2	Establish subsystem reliability weighting factors and rationale and/or reference sources.
4.3	Perform system/subsystem allocation.
4.4	Perform reliability predictions; report analysis results.
4.4.1	Determine if reliability requirements or goals are met.
4.4.2	Determine if re-allocation is feasible and show rationale.
4.4.3	Re-allocate reliability.
4.4.4	Determine if requirements or goals are met.
4.4.5	Determine if design changes are feasible.
4.4.6	If yes, incorporate design changes; update

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estimates.

4.4.7 If not, management accepts design risk.

4.5 Finalize system/subsystem requirement or goal.

5. NOTES

5.1 Directive Replacement. This Directive replaces S&MA-CR10-R-Y-008, Reliability Allocation.

6. SAFETY PRECAUTIONS AND WARNING NOTES

None.

7. APPENDICES, DATA, REPORTS, AND FORMS

None.

8. QUALITY RECORDS

<u>Quality Record</u>	<u>Repository</u>	<u>Period of Time</u>
Reliability Allocation Report	Hardcopy maintained in R&M files in Building 4471 Room A105	Retain until end of program plus 3 years.

9. TOOLS, EQUIPMENT, AND MATERIALS

The user should define any tools, special equipment, or materials used during the reliability allocation process.

10. PERSONNEL TRAINING AND CERTIFICATION

Reliability training will include reliability allocation.

11. FLOW DIAGRAM

The following flow diagram represents the Reliability Allocation instructions outlined in Section 4.

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